

REDESCRIPTION OF *HELICARION CUVIERI* FROM SOUTHERN
TASMANIA AND *HELICARION FREYCINETI* FROM NEW SOUTH WALES
(PULMONATA: HELICARIONIDAE).

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SUMMARY

The shell and anatomy of *Helicarion cuvieri* Ferussac 1821 are redescribed and a neotype designated. The lectotype designated for *Helicarion freycineti* Ferussac 1821 is described with notes on the external features of the animal.

INTRODUCTION

Before the species *Helicarion rubicundus* Dartnall & Kershaw 1978 could be described, the type species of *Helicarion* required clarification. The type, *H. cuvieri* Ferussac, established by subsequent designation by Gray (1847) and the genus require more detailed description for stability. The type specimen of *H. cuvieri* was described as a shell with retracted animal in preservative apparently in the Paris Museum. Enquiries reveal that it is not in Paris, nor could it be located elsewhere. As French expeditions have collected in southern Tasmania this would be the most probably type locality. The taxonomic importance of the species to the family Helicarionidae requires the erection and description of a neotype. Enquiries concerning *H. freycineti* made at the same time established that syntypes existed in the Paris Museum. One of these shells is here selected as lectotype and is described.

HELICARION CUVIERI FERUSSAC

The significance of the type species of *Helicarion* to the Helicarionidae, very much as Australian sub-family (or family), requires species stability. Other Australian genera and new species held by authors outside Tasmania cannot be clearly established. Hedley (1891) and Semper (1885) described and figured the anatomy but neither define an adequate locality. Semper states "Van Diemensland. Zwei Exemplare durch V. Martens." Most authors, occupied with other groups, make only passing reference to the species (e.g. Rensch, 1932). Semper's figure 7 (i.e., plate 3) is sufficient for broad comparative use. Although Gray (1847, p. 169) designated *H. cuvieri*, some authors (e.g. Fischer, 1887) continued to use *H. freycineti*. This species also needs clarification. The next earliest species, *H. niger* (Quoy & Gaimard, 1832), has an existing type which will be described in a future paper.

Enquiry for the type of *H. cuvieri* has been fruitless. M. Tillier of the Paris Natural History Museum wrote that "the original material of *H. cuvieri* Fer"....."were already missing...Chevallier made his

review of the Ferussac collection (Bull. Mus. Hist. Nat., Paris, 37, no. 1, 1965, p. 167)". M. Tillier thought it possible that the specimen could be in the Deshayes collection, partly in the Ecole des Mines, but his enquiries there and elsewhere gave no result. Dr. Mordan sent a list of British Museum *Helicarion* material and European museums have assisted. Dr. B.J. Smith, while in Europe, looked further at the available material and following further discussion concluded the type was lost.

The precise type locality for *H. cuvieri* is unknown. Mt. Wellington is an obvious possibility but very little material is known from the region. A suitable population with long term stability was found near the Stuart Gordon Road, south from Maydena in south-west Tasmania. This site, which provides for adequate study, has been chosen as the 'type locality' for the neotype. Comparison indicates this population to be consistent with other southern material. The neotype has been lodged in the Paris Museum and voucher specimens placed in eastern Australian museums.

Among the synonyms listed *Helicarion verreauxi* has been recorded from Tasmania. Mt. Wellington is mentioned and Verreaux may have collected there but no material has been found specifying a locality. Possible type material of this 'species' is in the British Museum (N.H.) with the registered number 197780. It is labelled "Australia" with a pencilled note "Type on the right". At best it is a synonym but the evidence does not give the specimens syntype status. Two other names must be considered. Legrand in the first edition of his Monograph introduced *Helix vitrinaformis* which Cox, not having seen the animal, described for him as a new species. Petterd replaced this preoccupied name with *Helix buttoni*. Petterd & Hedley (1909), believing it to be *H. cuvieri*, discarded the name. Their comment that the name cannot be authenticated with a known shell can be considered accurate. The description of *Helicarion cuvieri* which follows is based on animals from both the neotype locality and from other areas.

DESCRIPTIONS

HELICARION CUVIERI FERUSSAC 1821

FIGURES 1-15

1819. *Helicarion cuvieri* Ferussac, *Hist. Moll.*, pl. 9, f. 8; 4 July.
 1821. *Helicarion cuvieri* Ferussac, *Tabl. Syst. Limacons*, p. 20; Jan.
 1825. *Vitrina cuvieri*. Gray, *Ann. Phil.*, 9 : 408.
 1850. *Vitrina verreauxi* Pfeiffer, *Proc. Zool. Soc. Lond.*, p. 132.
 1851. *Vitrina cuvieri*. Woodward, *Man. Moll.*, p. 163.
 1855. *Helicarion cuvieri*. Gray, *Cat. Fuim. Coll. Brit. Mus.*, 1 : 67.
 1862. *Vitrina verreauxi*. Reeve, *Conch. Icon.*, 13; pl. 4, f. 21.
 1868. Cox, *Mon. Aust. Land Shells*, p. 83, pl. 14.
 1871. *Helix vitrinaformis* Legrand, *Coll. Mon. Tasm. Land Shells*, sp. 58
 1871. *Vitrina (Helicarion) verreauxi*. Legrand, *op. cit.*, ed. 2, sp. 2.
 1879. *Vitrina verreauxi*. Petterd, *Mon. Land Shells Tasm.*, p. 49, sp. 1.
 1879. *Helix buttoni* Petterd, *op. cit.*, p. 55.
 1885. *Helicarion cuvieri*. Semper, *Reis. im Philipp.*, 3: 31, pl. 3, 1870-94.
 1891. *Vitrina verreauxi*. Hedley, *Proc. Linn. Soc. N.S.W.*, (2) 6: 24.
 1893. *Helicarion cuvieri*. Weigmann, *Weber's Zool. Erg. Reis. Niederl. Ost. Ind.*, 2: 114-119.
 1898. . Weigmann, *Abhandl. Senckenberg Ges.* 24: 319-34.
 1909. . Cox, *Alph. List Aust. Land Shells*, p. 22.
 1909. . Petterd & Hedley, *Proc. Linn. Soc. N.S.W.* (2) 7: 301.
 1912. . Cox & Hedley, *Mem. Nat. Mus. Vict.*, 4: 14.
 1921. . May, *Checklist Tasm. Moll.*, p. 97, no. 945.
 1923. . May, *Illustr. Index Tasm. Shells*, pl. 43, f. 26.
 1937. . Iredale, *Aust. Zool.*, 9 (1) : 7.
 1941. . Baker, *B.P. Bishop Mus. Bull.*, 166: 263.
 1955. . Kershaw, *Proc. R. Soc. Tasm.*, 89: 326.
 1958. . May, *Illustr. Index* (ed. Macpherson) pl. 43.
 1972. . Smith, *Vict. Nat.*, 89 (12) : 348.

DIAGNOSIS: *Helicarionid* snail with shell small to medium size, depressed sub-globose pale yellow, light orange yellow to light orange glassy sometimes tinted green; spire flatly convex, sutures shallow very narrowly margined, imperforate, aperture oval curving gently from body; animal various shades of grey often tinted pink or mauve, sometimes cream. Radular rachidian elongate narrow distinctly excavate, penial verge or pilaster absent.

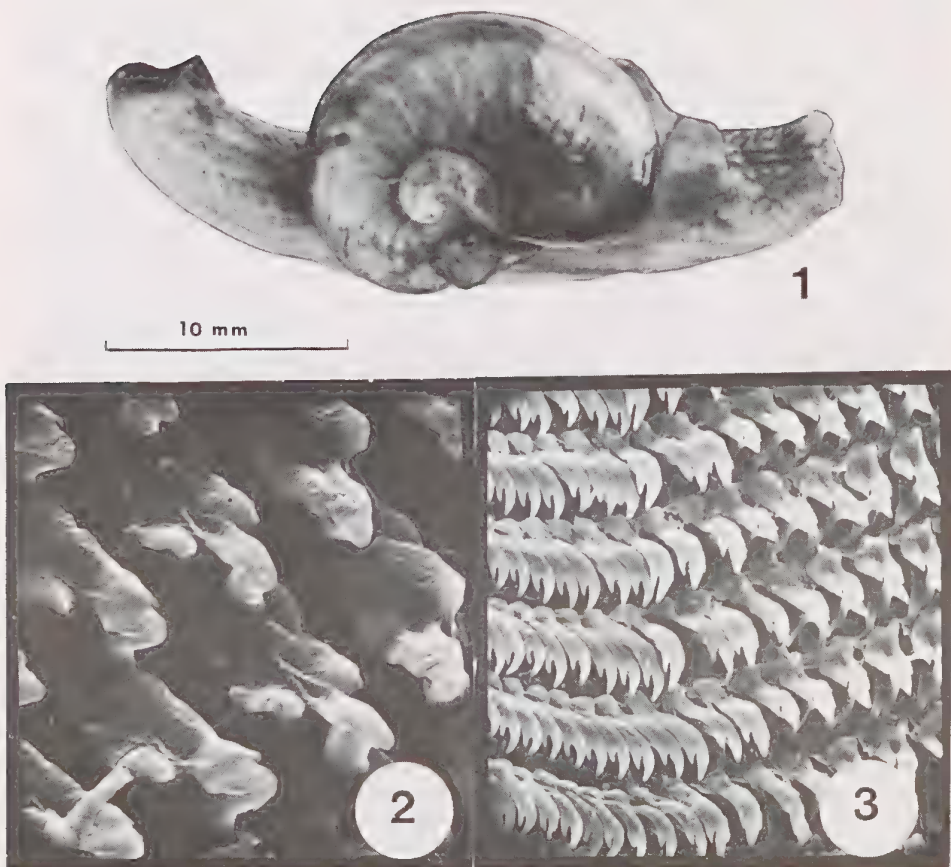
Shell (fig. 15) 3.25 whorls rarely larger, revealing body colours usually shades of yellow or orange in cream animals. Protoconch about 1.75 whorls pale, off-white or tawny grey ending at fine curved varix or depression; sculpture fine irregular variable microscopic rounded radial lirae cut by faint spiral striae sometimes minutely beaded, interstices minutely pustulate; juvenile brief, fine close

radial lirae. Whorl rapidly expands to adult of variable wave-like riblets, minute radial lirae may superimpose, riblets may be sharpened, usually strengthen near sutures on body whorl, surface can be weakly undulate, spiral striae very close very weak. Suture margin never significant; aperture lunate oval regularly gently curving from body, upper lip can straighten with maturity, columella weak membranous.

Animal grey with pinkish or mauve tints, darker dorsally, sometimes creamy, off-white or very dark grey, body tubercles may be grey with pinkish interstices, caudal margin can be off-white. Ocular tentacles (OT) dark grey or black, inferior greyish (fig. 9). Lappetts usually paler than body, fringed grey, right pallial lappett (RPL) with two small warts (fig. 12) dark or pale, mid-basal and posterior. Foot sole pale tripartite, central section broadest centrally, one-quarter to one-third of width tapering gradually but rapid over one-third of posterior length, almost flat; sole vertical margins slightly convex with a narrow line of tubercles above peripodial groove. Foot distinctly recessed about 1 mm beneath muzzle. In a shell of dimensions 12 mm max., 10.7 mm min. diameter the elongate right pallial lappett extends 6.7 mm from suture at aperture, 4 mm widest with basal wart 3 mm from extremity, left pallial lappett (LPL) 5.5 mm long 3.5 mm max. width, elongate triangular with two small warts, (fig. 12) extends around upper lip; right body lappett (RBL) an extension of pallial lappett, 4 mm long, 1 mm below pneumostome; mantle (M) distinct from lappett, variable, one specimen had mantle extending 2 mm from shell, 4 mm from ocular tentacles; muzzle extends 2 mm from ocular tentacles which are 1.5 mm apart, ornamented with small rounded tubercles, inferior tentacles smooth. Genital atrium (GA, fig. 5) below slightly posterior to right ocular tentacle, distinct oval or slit-like, lip smooth, adjacent tubercles slightly raised, penis white. Pneumostome slit-like or oval 0.8 mm wide defined with white tissue, may bulge. Foot bulging centrally, tail flattened below visceral mass, posterior keel one-quarter to a little more than one-third of tail length passing on to produced caudal horn. Body (fig. 1) ornamented with variable diamond shaped tubercles less defined below viscera, parallel on anterior dorsum, sloping posteriorly from posterior dorsum; an oblique line of tubercles always present sloping to atrium.

ANATOMY

Buccal mass (BM, fig. 9) elongate sub-rounded, jaw (fig. 10) arcuate translucent orange yellow or yellow with pale orange pointed extremities, cross section triangular, 1.5 mm wide, 0.4 mm thick, central protuberance rounded passing into small transverse ridge. Radular (figs. 2, 3) formula 30.14.1.14.30 of about 130 rows. Rachidian tricuspid with very narrow elongate mesocone curving from narrowly rounded tip, through a distinctly elongate excavation to a raised point between ectocones; ectoconal cusps set slightly more than one-half distance posteriorly, rather broad strong curved above, moderately pointed sloping posteriorly. Rear of tooth distinctly narrowed clearly curved. Lateral teeth with sub-elongate robust mesocone, a very small endoconal cusp protrudes a little less than one-fifth the distance from mesocone tip, ectoconal cusp in line with rachidian ectocone, curved bulging slanting to a point about one-half tooth length with clear excavation between ectocone and opposing lateral ridge of mesocone, a distinct sub-triangular minute cusp protrudes centrally between tip of ectocone and tip of mesocone, tooth posterior broad curved. Marginal teeth strongly curved with ectocone clearly posterior to mesocone slightly inwardly hooked, both cusps narrowly pointed. Rachidian base plate broad laterally convex strongly curved about posterior of next tooth with strong upright column to mesocone almost at tip. Lateral base plates elongate passing clearly below posterior of next tooth, column upright then slanting forward to mesocone cusp, base curved toward then away from rachidian base. Dartnall & Kershaw (1978, p.5) give a comparison of southern species. Reproductive system (figures 4-8): Penial complex commonly doubled into a partial figure of eight with retractor muscle (RM) at extremity of curve. Penis (P) expands distinctly then contracts variably to junction with epiphallus (EP); penial sheath (PS) very thin white transparent attached near atrium (GA), sheath retractor (PR) very thin elongate passing to penial retractor through connective tissue between arms of epiphallus. Penial retractor (RM) arises from very small straight transparent base which is traversed by a white vein (PV) passing through viscera adjacent to stomach (S) near pericardium (PC) to pallial system. Caecum absent. Flagellum (Q) distinctly sinuate (figs. 5, 8), normally less than one-fifth complex length, consisting largely of a defined lumen which I called the epiphallic gland (Dartnall & Kershaw, 1978, p. 3) externally ornamented with protuberances about curve of sinuation and two distinct lateral bulges.



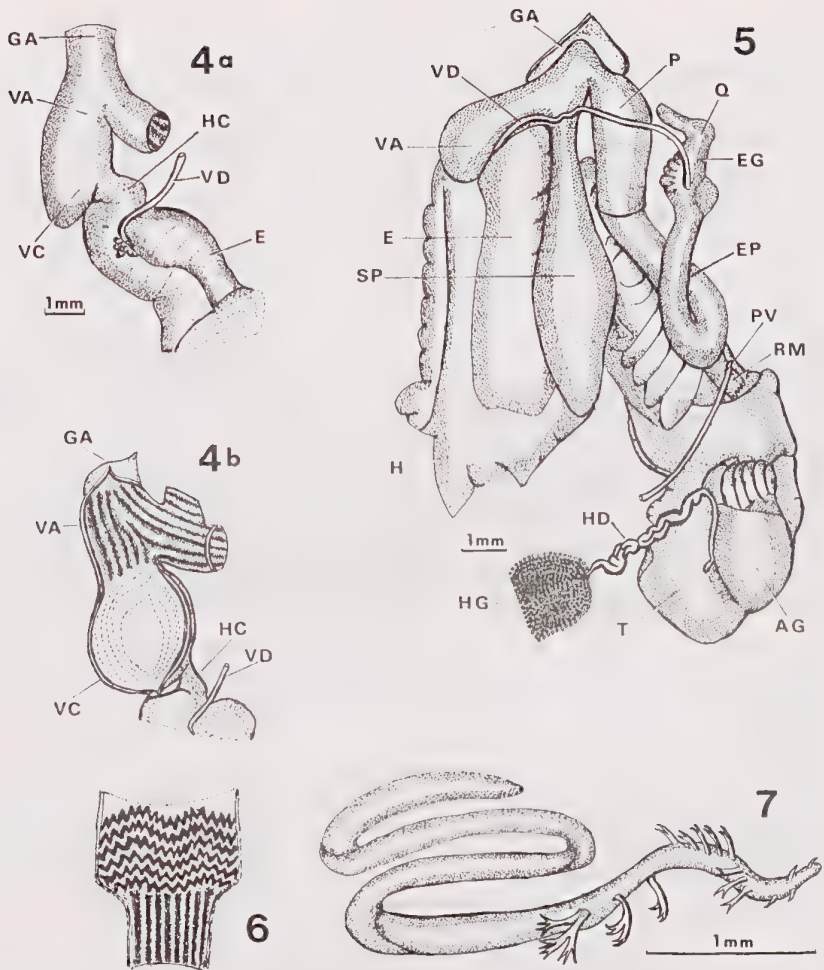
FIGURES 1-3

1. *Helicaron cuvieri* Ferussac .Neotype.

2. Radula: central and lateral teeth x 1400. SEM by Dr. B.J. Smith.

3. Radula: lateral and marginal teeth x 500. SEM by Dr. B.J. Smith.

Vas deferens (VD) inserts 1 mm - 1.5 mm from flagellum extremity adjacent and slightly lateral to bulge at a point three to four-fifths length of flagellum, transversely central but slightly variably situated. Epiphallic duct (EP) lined throughout with longitudinal pilasters minutely folded near flagellum, ending abruptly at penial junction (fig. 6) usually at a relatively slight constriction. Penis (fig. 6) lined with transverse folded lamellate pilasters. Verge or vergic pilaster absent, dart sac or sarcobellum absent. Spermatophore (fig. 7) with 15, mostly branching, spines somewhat variably spaced generally evenly distributed, the two largest corresponding with flagellum lateral bulges, the remainder with lateral sinuate curve. Internally these ornaments are crypt-like and form the spermatophore mould; when empty they are visibly interconnected. Bursa copulatrix (SP) very elongate pyriform with duct, opening from the small atrium (fig. 8), a narrow muscular peduncle one-third length of combined bursa and peduncle, lined with low rounded pilasters (fig. 4b) curving from atrium where broadly thickened. Bursa internally capacious, transversely lined with very thin transverse plicae some converging, variable bulging with contents. One specimen contained two complete spermatophores, another an encapsulated partly digested spermatophore. Subsharpened pilasters pass from atrium to vagina (VA, fig. 4b) adjacent to pilasters curving from bursa duct to entrance to an enlarged vaginal chamber (VC) (possibly a primitive homologue to the atrial



FIGURES 4-7

- 4a. Vagina-spermathecal junction enlarged.
- 4b. Section through vagina, bursa duct, atrial junction enlarged.
- 5. Reproductive system.
- 6. Section through junction of penis and epiphallus.
- 7. Spermatophore of *H. cuvieri* Fer.

AE - anterior oesophagus, AG - albumen gland, BG - buccal ganglia, BM - buccal mass, C - crop, CG - cerebral ganglia, DG - digestive gland, E - prostate, EP - epiphallus, EG - epiphallic gland, GA - genital atrium, H - uterine complex, HC - uterine duct, HD - hermaphrodite duct, HG - hermaphrodite gland, KD - kidney, LPL - left pallial lappett, OR - ocular retractor, M - mantle, P - penis, PaG - parietal ganglia, PC - pericardium, PE - posterior oesophagus, PeG - pedal ganglia, PG - pleural ganglia, PR - penial sheath retractor, PS - penial sheath, PV - penial retractor vein, Q - flagellum, R - rectum, RM - penial retractor, RBL - right body lappett, RPL - right pallial lappett, S - stomach, SP - bursa copulatrix, T - talon, U - ureter, VA - vagina, VC - vaginal chamber, VD - vas deferens.

diverticulum of Van Mol, 1970) from which a very short uterine duct (HC) passes to the spermo-vidual complex (figs. 4a, 4b). The strongly curved vas deferens inserts terminally with prostate (E) an off-white to cream minutely tubular organ of variable width adherent to the pale grey uterine section (H), the whole arising from the sub-cubic off-white, pale grey or pale buff albumen gland (AG, fig. 5). Hermaphrodite gland (HG) a sub-globular mass of very small acini embedded near apex of digestive gland (DG) visible as section across upper whorl; hermaphrodite duct (HD) yellow contorted short inserting with albumen gland within a shallow recess (fig. 5) on anterior aspect near junction with spermo-vidual complex, becoming a fine duct immersed below surface along alignment of recess to the 0.3 mm long very thin digitiform talon (T) embedded 2 mm below surface where duct branches to carrefour; talon white with some black capillaries on duct and talon surfaces. Talon structure in *Helicarion* described by Van Mol (1973). The albumen gland is situated between the anterior oesophagus, stomach and pallial wall, hence is visible through the shell; the bursa copulatrix is situated latero-dorsally and the penial complex dorsally to the spermo-vidual complex (fig. 5). The right ocular tentacle passes dorsally over the penis to the retractor below the spermo-vidual complex (fig. 9). Digestive complex (fig. 12): Buccal mass (BM, fig. 9) sub-rounded elongate 3.0 to 3.5 mm long, 2.5 mm diameter, retractors postero-laterally sub-terminal, anterior oesophagus (AE) with elongate rarely grossly expanded crop (C) commonly encased through much of its length in a sleeve of muscular and fatty tissue, expand into stomach (S); posterior oesophagus (PE) curves through the digestive gland recurving below stomach (not in a double coil as in *H. rubicundus*) about 20 mm long to rectal duct (R) opening to exterior dorsally just within pneumostome. Bilobate digestive gland (DG) pinkish to pale buff, kidney (KD) dorsal below pallial surface, cream elongate with primary ureter sharply recurving to secondary ureter (U) alongside rectum. Vascular, neural and muscular complex: Pallial surface vascularised, pericardium (PC) closely antero-laterally to kidney, auricle large with thin transverse lamellae internally (fig. 14), a thin central diaphragm has a small hiatus, main pallial vein clear, ventricle very small. Penial vein (PV) from pallial surface to penial retractor may provide pressure to penis. Circumoesophageal central nervous system situated posterior to buccal mass, the relationship depending on degree of retraction. Cerebral ganglia (CG, fig. 11) elongate ovoid slanting anteriorly and laterally to buccal mass joined by a short commissure, give rise to the nerves to the ocular tentacles (OT) and retractors (OR), inferior tentacles, buccal mass and ventrally to the penis from the right ganglion. Flexible cerobro-buccal commissures arise latero-ventrally passing to buccal ganglia (BG) which provide nerves to the oesophagus and pharynx, these and remaining ganglia encased in tissue. Pleural ganglia (PG) posterior to and slightly below buccal ganglia, with parietal ganglia smaller and ventral but dorsal to the pedal ganglia, with small visceral ganglion between. A count of eighteen connectors radiate fan-like to the body cavity from the pedal ganglia (PeG) which also provide nerves to the vagina, bursa, spermo-vidual complex, penis and vas deferens. A major nerve emerges between the right buccal and pleural ganglia laterally to penial retractor, another from the pleural ganglia to albumen gland; nerves from the parietal ganglia (PaG) connect posteriorly to the spermo-vidual complex. Minor nerves immersed in tissue connect pedal ganglia nerves to vagina anteriorly. The parietal ganglia provide nerves to the cavity floor and retractors but not all of these and others have been traced. Tentacular retractor muscles interconnect to pass down the right side of the oesophagus to the columella with the buccal retractors, the latter arising 2 mm from the muzzle pass below the cerebral ganglia. Strong muscles support the buccal - ganglionic system. Paired retractors pass to the posterior of the body cavity, another pair from the columella to body cavity walls laterally below ocular tentacles. Penial retractor connects with pallial floor. Penis, atrium and buccal muzzle all capable of eversion which is common when an animal is relaxed before fixing, suggesting that muscular relaxation has occurred. Comparison with other described species in Tasmania and Victoria is given by Dartnall & Kershaw (1978) for various features.

TYPE MATERIAL

Neotype (fig. 1): Museum National D'Histoire Naturelle, Paris; from litter in rain forest near Needles Picnic Ground south of Strathgordon road, south-west Tasmania. Grid reference topographical survey 1 : 100 000 sheet 8112 Wedge, 452500 ME 5265500MN, collected R.C. Kershaw 8 April, 1977; entire animal preserved in alcohol. Voucher material: two specimens Tasmanian Museum E10388, two specimens National Museum of Victoria No. F 30142, one specimen Australian Museum No.C.111938, one specimen Queen Victoria Museum 1978/9/1 QVM No. 355.

DIMENSIONS

| | | Length (mm) | | Height | Approx. foot length (preserved) |
|----------|---|-------------|---------|--------|------------------------------------|
| | | Maximum | Minimum | | |
| Neotype | | 10.6 | 9.0 | 5.5 | 23 |
| Vouchers | | | | | |
| E10388 | a | 11.0 | 9.0 | 5.8 | 24 |
| | b | 10.6 | 8.8 | 5.7 | 18 |
| F30142 | a | 11.4 | 9.0 | 6.0 | 24 |
| | b | 10.0 | 8.6 | 5.2 | 20 |
| C.111938 | | 10.9 | 8.9 | 5.1 | 20 |
| 1978/9/1 | | 8.7 | 6.9 | 5.0 | 18 |

DESCRIPTION BY FERUSSAC

"A very distinct species especially by its colouring. It is oval, sub-globular. Its spire very short, number of whorls four, barely convex and its increase in size is very rapid, the suture is simple and superficial. The last whorl is very large, wide on the top, convex at the circumference, a little depressed in the centre, ended by an aperture of medium size, oval, semi-lunar, almost as high as wide. The columella is short regularly curved, it is thin and sharp and continues without interruption with the right margin. The latter is barely convex in front, it is thin sharp and its membranous margin is bent back within as a result of the dessication of the shell. The whole surface is brilliant and polished and yet you notice on it a rather regular series of ridges in the form of little folds which are gradually reduced toward the aperture. Although thin and transparent this shell is of a brownish green darker than the majority of other species. It belongs to the genus *Helicarion* of Ferussac. Its animal contracted in the preservative has the foot strongly truncated behind by a large mucus crypt of which the opening resembles a small vault with a pointed arch. The shell is 14 mm long and 9 mm thick."

The neotype matches the original description in most aspects. A shell of four whorls is unlikely to be found, the largest seen being 3.6 whorls. A Maydena specimen in hand measures 13 mm by 9 mm. Few reach this size but shells of unknown locality have been seen. The colour is related to the environment.

ANATOMY ACCORDING TO HEDLEY

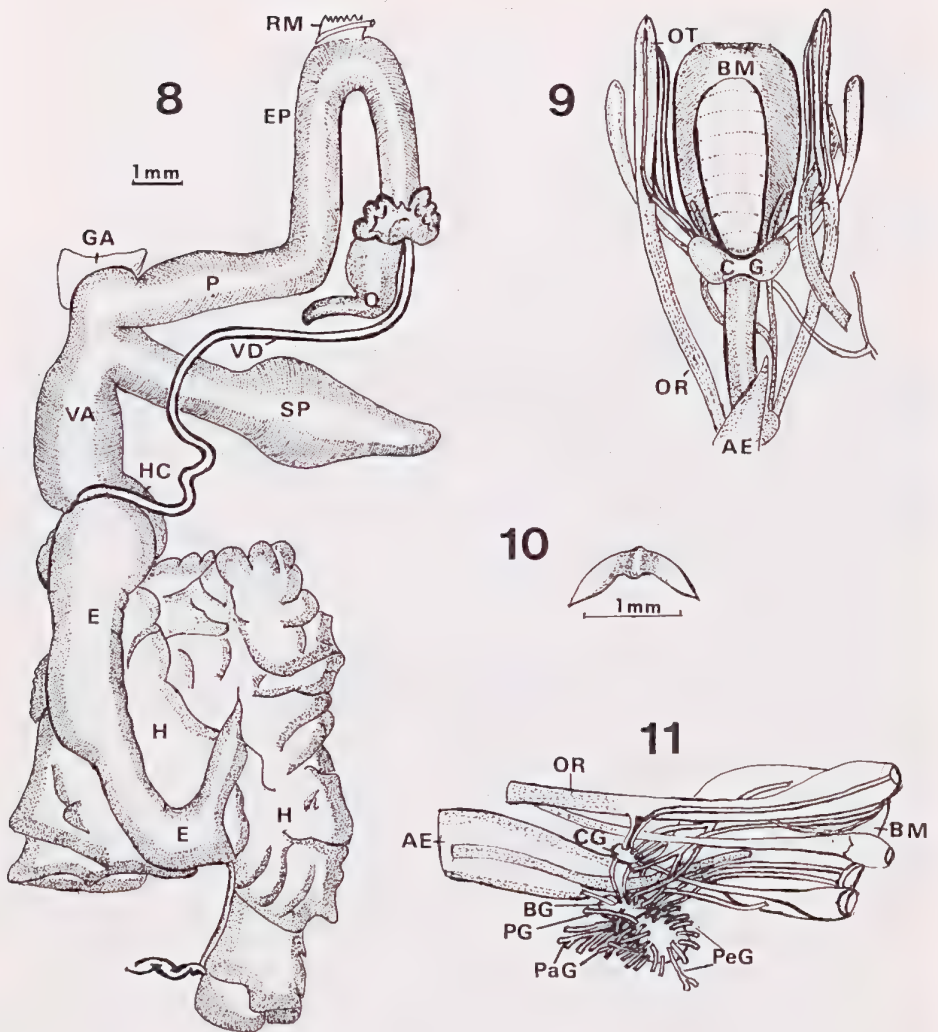
Hedley (1891) gave no specific locality with his description. Both Petterd and Dyer who assisted Hedley lived in northern Tasmania where black animals except for the yellow tail normally occur. Similar colouration has been observed in a south-west snail. The illustration of the genitalia bears some resemblance, the most significant difference being "the small round knob". The coil of the flagellum under low magnification could appear knob-like. Solem (1966) refers to such a feature in his sub-family description. This point was discussed with Dr. Solem but he could not recall its origin. He would not have overlooked Hedley's but Semper's (1885) figure shows a small knob at the tip of the elongate flagellum of his '*H. freycineti*'. Hedley's radular formula of 130 rows of 70.17.1.17.70 could suggest a northern animal if he counted the cusps of the marginals. The teeth illustrated are helicarionid but no northern animal studied to date fits the description. Black morphs occur in lower central Tasmania; it is possible he had one of these. Semper's (1885) description of *H. cuvieri* does not clarify the matter. *Helicarion* was known to past authors but only on a comparative basis; unfortunately the type species was not known with sufficient accuracy.

DISTRIBUTION

Helicarion cuvieri is here regarded as having a southern Tasmanian distribution. Study of some isolated morphs has not been completed but the species *sensu stricto* does not occur in northern or western regions nor on Bass Strait islands. Reports in the literature of mainland occurrences have not been proved. The habitat is rain forest to humid woodland, often below logs, although litter and moss are also favoured.

HELICARION FREYCINETI FERUSSAC

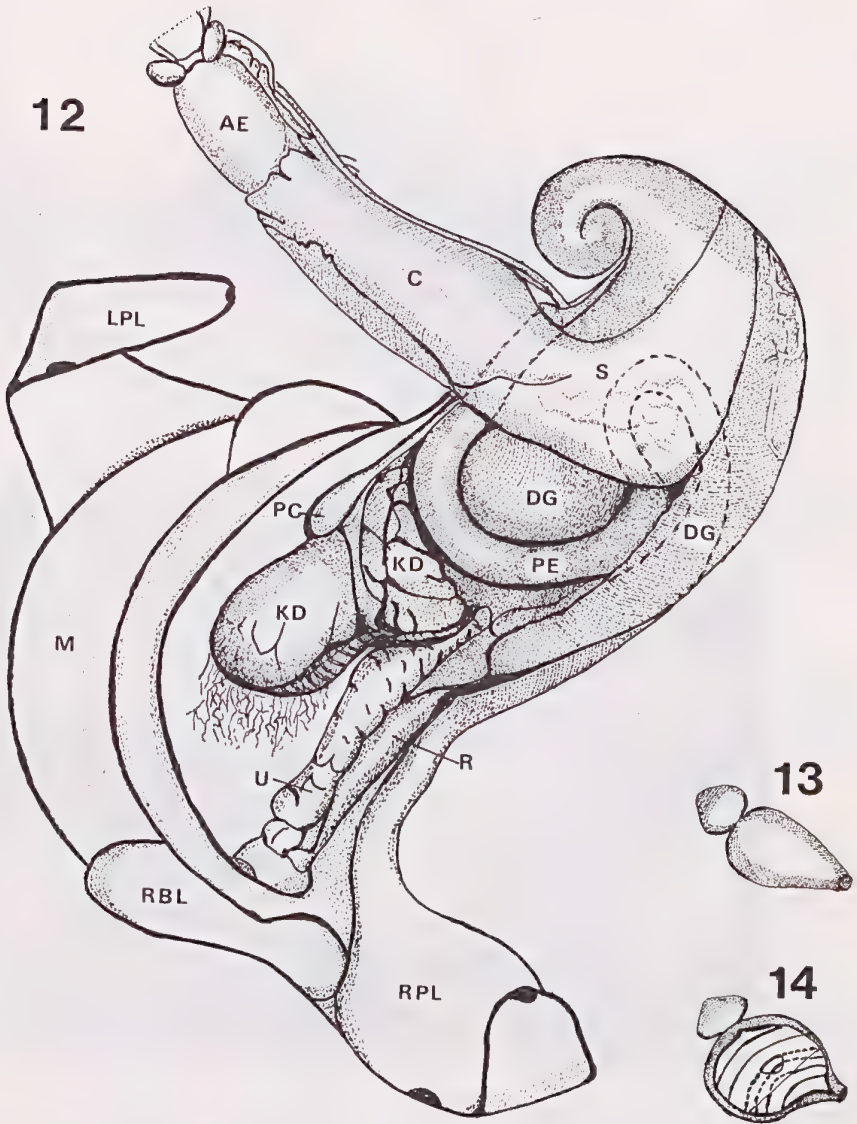
Syntypes from the Paris Museum were sent by M. Tillier. The three specimens proved to be from Botany Bay with the label 'Collect. Ferussac, 1837'. Enquiry for the type specimen was made at



FIGURES 8-11.

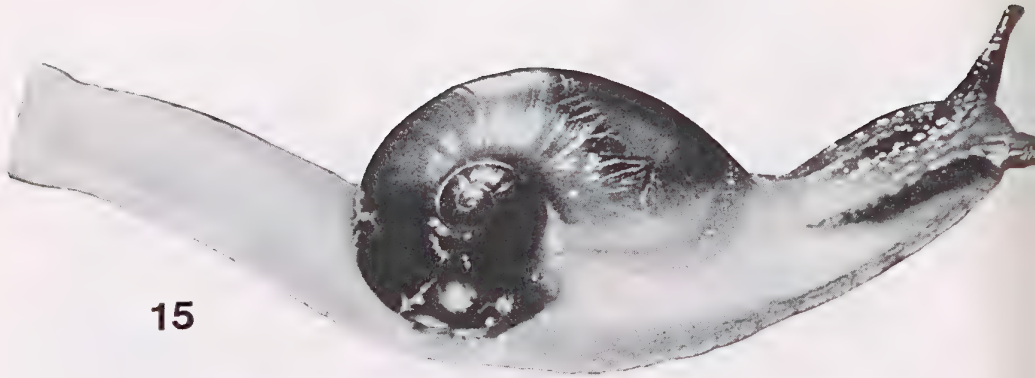
8. Detail of reproductive system, flagellum reversed
9. Buccal mass region, dorsal view.
10. Jaw.
11. Central nervous system, lateral view.

the same time as that for *H. cuvieri* and the above material, which was considered 'types' by Paris, all that could be accepted. M. Tillier wrote that the specimens "must be considered as syntypes, and you should select a lectotype among them." As Dr. Paget of Vienna wrote that there is no *Semper* material in his museum a lectotype was chosen as suggested. None of the Paris material is marked 'type' although two older labels were present. In addition two lots of animals sent were studied. One is labelled '*Vitrina freycineti* Fe. du Port Jackson Mss. Quoy et Gaimard 1819'. The genitalia had been removed. Probably collected during the Uranie voyage, it is not likely to have reached Paris

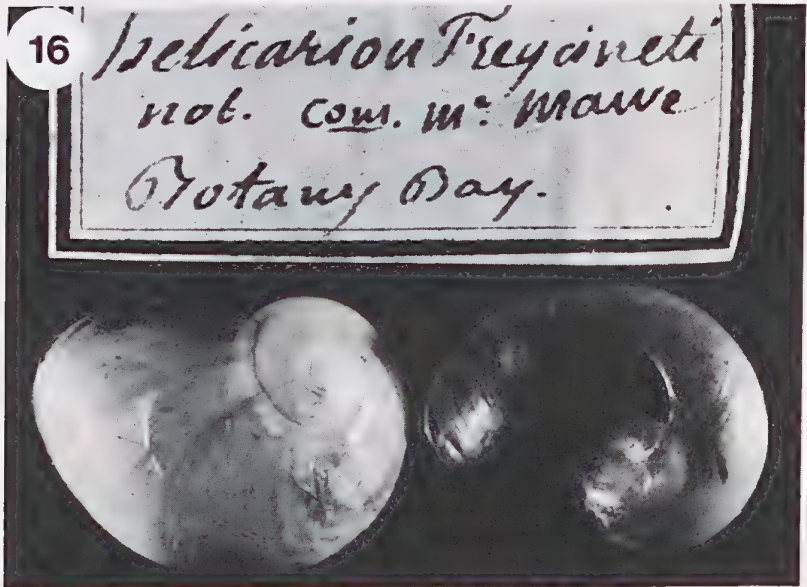


FIGURES 12-14.
 12. Digestive system, dotted lines indicate location of oesophagus.
 13. Heart, removed from pericardium.
 14. Section through heart showing auricle internal detail.

in time for Ferussac's 1819 work. The second lot (two intact animals without shells) from Port Jackson were collected by Quoy and Gaimard; the label 'Exp^d. d'Urville 1829'. The three shells from Paris can be considered syntype material because they belonged to Ferussac's collection and were apparently of similar age to his described specimen. They came from an area close to the type locality. In the absence of other type material the largest shell is designated lectotype and the



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FIGURES 15-16.

15. *Helicarion cuvieri* Ferussac, live animal.16. *Helicarion freycineti* Ferussac. Dorsal view of lectotype, ventral view of paralectotype.

remaining two paralectotypes. The animals, although collected in the type locality, are not of the same collection, but should be regarded as voucher material.

DESCRIPTIONS

HELICARION FREYCINETI FERUSSAC

Figure 16

1821. *Helicarion freycineti* Ferussac, *Hist. Moll.*, livr. 13, pl. 9a, f. 3A.1821. . Ferussac, *Tabl. Syst. Limacons*, p 24.

1825. *Helicolimax australasiae* de Blainville, *Man. Malac.*, p. 462.
 1825. *Vitrina freycineti* Gray, *Ann. Phil.*, 9: 408.
 1849. Pfeiffer, *Proc. Zool. Soc. Lond.* 1849: 132.
 1851. Woodward, *Man. Moll.*, p. 163.
 1855. Gray, *Cat. Pulm. Collt. Brit. Mus.*, 1: 67.
 1862. Reeve, *Conch. Icon.*, 13, pl. 6, f. 40, sp. 21.
 1868. Cox, *Mon. Aust. Land Shells*, p. 83, pl. 14, f. 7.
 1885. Semper, *Reis. im Philipp.*, 3: 31, pl. 3, pl. 6.
 1887. Fischer, *Man. de Conch.*, p. 459.
 1909. *Helicarion freycineti* Cox, *Alph. List Aust. Land Shells*, p. 31.
 1937. Iredale, *Aust. Zool.*, 9 (1) : 7.
 1941. *Vercularion freycineti* Iredale, *Aust. Nat.*, A1 (1) : 6.

DESCRIPTION BY FERUSSAC

"A species very close to *Vitrina monticola* Benson. It is more globular and with the spire a little more prominent. It is oval the spire barely convex, very short, formed of three whorls rapidly increasing, (re)united by a linear suture, simple and superficial. The last whorl is very big, depressed yet rather thick and convex at the periphery, wide below, a little depressed towards the centre. It ends in a very oblique aperture, very large, oval-oblong with elongated columella, thin regularly arched and accompanied by a membranous margin slightly slanted. The peristome is always thin, sharp, a little inverted inwards, convex in front, it is separated from the penultimate whorl by a not very deep angle. All the surface is smooth shining covered with ridges, rather large and increasing irregularly. This species is thicker and more solid than the majority of other species of the same genus. It is less transparent, its colour uniform, of a tawny yellow, fairly dark washed with green. The animal belongs to the genus *Helicarion* Ferussac, it is represented in this work violently contracted as result of having been submerged in liquid. Its foot is truncated and ends posteriorly in a large mucus crypt. This species is large, 19 mm long, 8 mm high."

DESCRIPTION OF LECTOTYPE

Shell (fig. 16) almost 3.5 whorls pale yellowish translucent, the last whorl descends slightly giving the spire a prominent aspect. The whorl slants slightly toward aperture, margin membranous but little evidence of inversion. Sculpture low irregular smooth ridges close shining, large near aperture, variable, radial weak irregular at periphery, crossed by extremely fine spiral striae. Shell not very thick or solid. Protoconch 2.25 whorls pale almost white, sculpture very weak radial lirae clearer at sutures, spiral striae barely visible.

| DIMENSIONS | Diameter | | Height | Aperture | | No. of Whorls |
|----------------|----------|---------|--------|----------|---------|---------------|
| | Maximum | Minimum | | Height | Width | |
| Lectotype | 16.5 mm | 13.0 mm | 9 mm | 10.5 mm | 11.0 mm | 3.5 almost |
| Paralectotypes | 14.6 | 11.5 | 7.0 | 10.4 | 9.4 | 3.5 almost |
| | 14.8 | 11.5 | 8.4 | 9.0 | 9.5 | 3.4 |

Animal (collected by Quoy & Gaimard, Port Jackson, 1819) pale buff almost khaki, right pallial lappett thickened, rugose, 6 mm long, 3.5 mm wide, right body lappett with slightly elongated orange wart anteriorly, 2.5 mm wide below pneumostome, 7.0 mm long; left pallial lappett rounded 2.0 mm long, 1.5 mm wide curving across lip. Mantle about 3.0 mm long on neck, 6.5 mm wide. Foot sole tripartite, flat, 4.5 mm wide, central section tapering to foss, lateral margins 1.0 mm high to distinct peripodial groove, tail dorsally with distinct 2.5 mm keel to non-protruding caudal horn. Preserved animal bulky, 29 mm long 5.6 mm wide, anterior height 5.0 mm, at foss 3.5 mm, surface tubercular distinctly slanting posteriorly from hump, anteriorly sub-rounded, tubercles near verticle, lines of tubercles some broad 0.8 mm dorsal to 1.1 mm ventral width irregularly shaped, defined on tail, a distinct line slants forward below atrium; mantle surface rugose with small pustules. Tail 13 mm from base of viscera less than half the length. Kidney and albumen gland visible through visceral hump, the former pale cream, the latter pale orange. No wart is present in the other animals but mantle and lappetts are rugose in each case.

Iredale (1941) refers to reddish colour on the sides of the foot, but as such colours are sometimes unstable in preservative he may have had a fresh animal. Semper (1885) figures the genitalia. He shows the penis with a marked basal constriction, the flagellum very long with a small terminal knob. The bursa duct enters just anterior to the uterus remote from the atrium, the vagina straight not swollen. His figure of the teeth shows the rachidian mesocone long, slim and pointed, the

ectocones in the lateral teeth less pronounced. Iredale (1941) places *H. freycineti* in his genus *Vercularion*. This would be based on superficial characters, and as Semper had animals from Sydney and Cape York his description may be suspect on locality.

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